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DIFFERENCES IN AUDIT QUALITY BETWEEN AUDIT FIRMS: THE IMPACT OF AUDIT-FIRM PORTFOLIO CHARACTERISTICS

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Differences in Audit Quality between Audit Firms: The Impact of Audit-Firm Portfolio Characteristics

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ABSTRACT

Companies generate financial statements that are used for decision making by various stakeholders and the quality of those financial statements depends on the quality of the external auditor. There exists empirical evidence of quality differentiation between audit firms, but the audit-quality proxy that is typically used, auditor size (big 6 / non-big 6 firm), is very rough. The major purpose and contribution of this paper is to further investigate audit-quality determinants empirically. To that end we test the impact on financial statement and audit quality of audit-firm portfolio characteristics, that we selected based on a well-perceived theory by DeAngelo (1981). We indeed find that audit-firm portfolio characteristics better explain variations in financial statement and audit quality. In particular: 1) the short-term leverage of an audit firm's portfolio is negatively, and 2) the number of clients in an audit firm's portfolio is positively associated with financial statement and audit quality.

Keywords:

audit quality, audit-firm portfolio characteristics, financial statement quality, factor analysis, logistic regression

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1. INTRODUCTION

Reliable information is crucial for sound economic decision making. Companies typically generate and report information about their business activities. This information is used for decision making by company stakeholders, such as investors, creditors, suppliers, employees, regulators, tax authorities and competitors. A company's financial statements are an important subset of such company information. To safeguard the quality, reliability and consistency of financial statements various corporate governance mechanisms can be installed in firms. The external, independent audit of the financial statements is one such mechanism. However, the value of such an audit depends on the quality of the audit firm that executes the audit engagement.

Audit quality is thus crucial for financial statement quality, but is intangible and hence difficult to measure. A widespread used definition of audit quality is provided by DeAngelo (1981) and is the consumers' perception of the joint probability that an auditor (a) discovers a breach in the client's accounting system and (b) reports that breach. This definition contains two important aspects, namely: auditor competence and independence. In the auditing literature little attention has been paid to the empirical assessment of determinants audit quality. One surrogate that is frequently used is audit-firm size, which is typically measured by the dichotomous big 6 / non-big 6 variable (Colbert and Murray 1998). Theories have been put forward to underpin the positive relationship between audit-firm size and audit quality. DeAngelo (1981) relates audit quality to auditor size based on auditor-reputation effects. As reputation damage might result in loss of clients or reduced future audit fees, auditors will want to avoid bad publicity regarding their services. As large audit firms

(measured by the total number of clients) stand to lose more, DeAngelo hypothesises that those firms will have a greater incentive to maintain a certain level of audit quality, as compared to small audit firms. Dye (1993) adds to the work of DeAngelo and focuses on the wealth that is at stake when an audit firm is subject to litigation. He argues that large audit firms are inclined to supply a higher quality compared to small firms, as more wealth is at stake in large audit firms.

Most *empirical* work on audit quality focuses on the *implications* of differentiated audit quality and audit-firm *size* is typically used as a measure of quality differentiation. Examples of such implications include: 1) Differences between big 6 and other firms as to audit fees charged, with higher fees for big 6 firms (see, for example, Simunic 1980; Palmrose 1986a,b; Francis and Simon 1987; Gist 1992; Craswell et al. 1995), 2) Differences between big 6 and other firms as to audit reports issued, with more qualifications issued by big 6 firms (Citron and Taffler 1992; Mutchler 1996; Gaeremynck and Willekens 2001), 3) Differences between clients of big 6 and other firms as to earnings management, with big 6 clients engaging less in earnings management (Becker et al. 1998; Vander Bauwhede et al. 2001); 4) Differences between clients of big 6 and other firms as to management earnings forecasts, with big 6 audit firms being associated with larger error forecasts (Davidson and Neu 1993); 5) Differences between clients of big 6 and other firms as to pricing by the capital markets, with higher earnings response coefficients for big 6 clients (Teoh and Wong 1993) and smaller amount of underpricing at the time of an IPO when the financial statements are verified by a big 6 auditor (Beatty 1989; Balvers et al. 1988). We are unaware of a study that aims at empirically addressing audit quality determinants as such.

Given the importance of the external audit function in the economy, the major purpose and contribution of this paper is to further investigate audit-quality determinants empirically. To that end we link audit quality to financial statement quality, and define a client's compliance (or not) with a new accounting regulation as our measure of financial statement quality. The audit-quality (and hence financial statement quality) determinants that we propose to test are all characteristics of the client portfolio of the audit firm. Like the traditionally tested auditor-size (big 6 / non-big 6) variable, they are also based on the reputation theory in DeAngelo (1981). However, audit-firm portfolio characteristics are *finer* than the auditor-size variable as they measure both 1) the probability of reputation damage *and* 2) the monetary consequences. As the number of viable portfolio variables is rather large, we performed a factor analysis to select a reduced set of representative variables. This resulted in five factors/dimensions within the portfolio variables, namely: profitability, liquidity, leverage, visibility and volume. Finally, we performed a multivariate logistic regression analysis to test whether and which audit-firm portfolio characteristics explain differences in financial reporting behavior of the auditor's clients. The results from the analysis show that audit-firm portfolio characteristics better explain differences in financial statement quality than the traditionally used big 6/ non-big 6 variable.

The remainder of the paper is organised as follows. In the next section we develop our hypotheses. In Section 3 we clarify our measure of financial statement quality. Next, we define the audit-firm portfolio measures and report on the factor analysis we applied. In Section 5, we specify the logistic regression model that we

used to test the hypotheses. We then comment on the sample selection procedure that we adopted in Section 6. A discussion of our results follows in Section 7, and in the final section we provide a brief summary.

2. HYPOTHESES

Managers have incentives to report in ways that are in their best self-interest, even at the expense of the firm's owners (Watts and Zimmerman 1986). Some examples are: aggressive financial reporting, not revealing value relevant information, and too late or not applying new accounting standards. One of the responsibilities of an auditor consists in counteracting this opportunistic reporting behavior, thereby improving the quality of the financial statements. The main research question in our paper is whether audit quality is affected by the *audit firm's portfolio characteristics.*

As suggested by DeAngelo (1981) and Dye (1993), an audit firm is induced to exercise more audit effort and consequently supply higher audit quality the bigger its concern to safeguard its reputation and avoid litigation. The future of an audit firm is jeopardised by potential damage resulting from insufficient or inappropriate reporting practices adopted by clients. Further, public criticism on an audit firm's practices may also considerably lower the public's confidence in that firm and damage its reputation. The expected reputation damage associated with below-standard audit quality is affected by two factors: 1) the probability of occurrence of reputation damage *and* 2) the monetary consequences of reputation damage.

Expected Reputation Damage = P(Reputation Damage) * Monetary Consequences of a reputation damage

We argue that the probability of reputation damage is affected by the *financial performance* of *all* clients in the portfolio of an auditor. First, because it is reasonable to expect that client *financial performance* influences the likelihood of reputation damage. According to a recent study by Lennox (1999) based on articles in the financial press, audit firms receive most criticism for not giving adequate warnings of bankruptcy. It is also a fact that most litigation is associated with audit clients that experience financial distress. Second, it is obvious that the financial performance of *all* firms in the portfolio matters. Even if the performance of some client is excellent, the weak performance of another client followed by reputation damage (for example press articles, stakeholders' lawsuits) can influence the relationship between the audit firm and the other clients in the portfolio (for example no renewal of the audit term). This leads to our first hypothesis:

HYPOTHESIS 1: *As the portfolio of an auditor is financially weaker, the auditor will supply higher audit quality, which in turn results in higher financial statement quality (FSQ).*

However, not only the probability but also the potential monetary consequences of reputation damage will influence auditor behavior. This reputation *cost* depends on the *exposure* an audit firm faces. The size of reputation damage is also affected by some characteristics of the audit portfolio, such as the number of clients, the size of the clients and the visibility of the client (attention by the different stakeholders). Audit firms with a larger clientele and/or that charge relatively large audit fees stand to lose more and will thus perceive a greater threat from reputation damage (De Angelo 1981). This results in the following hypothesis:

HYPOTHESIS 2: *As the portfolio of an auditor contains more, larger and highly visible clients, the auditor will supply higher audit quality, which results in higher financial statement quality (FSQ).*

3. DEPENDENT VARIABLE: FINANCIAL STATEMENT QUALITY

As audit quality is intangible, we are linking it to a measure of financial statement quality that is clearly affected by it. Our measure of financial statement quality is an audit client's compliance with a new accounting regulation that was imposed in Belgium in 1997. In that year Belgian bankruptcy legislation, which dated from 1951, was amended. Apart from changes made to prescribed bankruptcy procedures, a new paragraph was added to the Company Law. This paragraph imposes a new reporting requirement for firms that are 'in difficulties'. The law defines 'firms in difficulties' as firms that report either a loss in the income statement during two consecutive financial years *or* a negative retained earnings figure on the balance sheet. When one of these situations holds, the company's Board of Directors is required to disclose whether it continues to adopt a going-concern valuation basis for the company, or whether it chooses to adopt a liquidation basis for valuation. Further, if the first option is chosen the Board is obliged to give a motivation why a going concern perspective is maintained. The financial reporting decisions the Board (or management) takes and the possible interactions with the external auditor are presented chronologically in Figure 1. First, if a firm faces financial problems, managers have to decide whether to continue operations. If the decision is liquidation, then the accounting standards

prescribe that every item in the balance sheet is valued at its realisable value. The new standard does not apply to companies that make this choice. If the decision is to continue operations, the new standard does apply and management's decision is whether to disclose the required information or not. If the decision is non-disclosure, the auditor can influence the reporting process and demand disclosure, but in the end it is still management that decides whether or not the valuation basis is justified. For the purpose of this paper, we consider financial statement quality as high, if an audit client in difficulties that chose the going-concern valuation method, complies with the new requirement and provides a motivation for its valuation choice in the notes.

[Insert Figure 1 about here]

4. SELECTION AND FACTOR ANALYSIS OF AUDIT-FIRM PORTFOLIO CHARACTERISTICS

The independent variables in this paper include audit-firm portfolio characteristics. We gathered two types of audit-firm portfolio variables: 1) variables that capture financial health characteristics of the aggregate audit-firm portfolio (see Hypothesis 1), and 2) variables that have an impact on the monetary consequences of reputation damage (see Hypothesis 2). To measure audit-firm portfolio characteristics, we selected all client firms from the Belgian National Bank (BNB) database that appointed a statutory auditor in 1997. We then identified the audit firms in which these statutory auditors were active by inspecting the membership lists published by the Belgian Institute of Auditors. We found that 165 different audit firms were active in the Belgian statutory audit market in 1997 and together audited 15450 client firms.

We then selected the financial statements of these 15450 client-firms from the BNB-database, and used them to compute our audit-firm portfolio measures.

As to the first set of audit-firm portfolio variables, namely those capturing financial health characteristics, we selected financial ratios measuring liquidity, profitability and solvency aspects of the portfolio in line with prior literature on bankruptcy prediction (see, for example, Altman 1968; Ohlson 1980; Zmijewski 1984; Hopwood et al. 1994; Kane et al. 1998). An overview of the selected variables can be found in Table 1. They are used to explain the cross-sectional variances between audit firms as to the average financial health of the clients in the portfolio. We measured each of ratios as follows: for each audit firm, j, we computed the median value of all individual client ratios. We preferred the median above the mean, as it better neutralises the impact of outliers.

As to the second set of audit-firm portfolio variables, we introduced several determinants of potential monetary consequences of reputation damage. An overview of all these variables can also be found in Table 1. We argue that reputation cost depends on the number as well as on the size and the visibility of the clients in an auditor's portfolio. First, assuming that each client in a portfolio has the same impact on an audit firm's reputation, we expect that the number of clients is positively associated with the size of the reputation cost. Second, we also expect that the size of the clients in the portfolio is important, as a larger amount of audit fees is lost with larger clients should reputation be damaged. Therefore we also include two frequently used size-measures: the median value of total assets and the number of employees per client in the audit-firm portfolio. Third, we also include a variable that captures both

the size and the number of clients in one, namely, the sum of all assets of the auditor's clients. Finally, we include a visibility measure, namely the relative percentage of audit clients with a works council. A works council is mandatory in Belgium in firms that count more than 100 employees, and in such firms the statutory auditor has the legal duty to clarify the information provided in the financial statements to the employees. When the auditor faces criticism in such firms, unions will lose faith and the auditor will probably loose the appointment in this or other firms with a works council.

[Insert Table 1 about here]

We applied a factor analysis, in particular, a principal components analysis to the 14 variables in Table 1. We did this for two purposes. First, to assess how many different dimensions of an audit firm's portfolio need to be introduced in the subsequent regression analysis and hence to reduce the number of test variables. A large set of test variables could cause multicollinearity problems. Second, to find an empirical confirmation for the assessed structure in our variables. As stated in the hypotheses section, we believe that both a probability and a monetary dimension can be discerned. The factor pattern (loading) matrix is presented in Table 2. Using both the "eigenvalue-greater-than-one rule" and the Scree test, the number of factors is set to five. Overall, this five-factor solution accounts for 70 percent of the variance in the measures. The variables found to load 0.60 or higher on a factor are selected as its domain. There is no evidence of a single, general factor accounting for a large percentage of the variations in the data. The level of item-variance for each factor, ranging from 18.4 to 8.27 percent, suggests that the five factors are nearly equally

important in evaluating a client portfolio. Elements of all five factors will thus be introduced in the multivariate model developed in the next section.

[Insert Table 2 about here]

We named each of the five factors after those variables that loaded significantly on them and by examining their underlying common trait. As shown in Table 2, four variables load high on the first factor. All four have in common that they assess the profitability of the auditor's clients, either in the past (PAUTO and PINDEP), the present (PROA) or both (PDIFFIC). Consequently, factor 1 is identified as the **'PROFITABILITY'** factor. Table 2 also shows that only PCURRENT and PQUICK load highly under factor 2. These variables assess a company's ability to meet its short-term financial obligations, and therefore are labelled **'LIQUIDITY'**. Factor 5 is labelled **'LEVERAGE'** because PCASH as well as PLEVERAGE have the highest loading on this factor. More specifically both variables consider the degree to which external financing is (or has been) necessary for respectively daily operations and investments. The third factor, identified as the **'VISIBILITY'** of the firm, is formed by PSIZE, PEMPLOY and PCOUNCIL. Either the median size of clients, the number of employees or the fact of having a works council can thus be used to measure visibility. Finally, factor 4 represents the magnitude or size of the client portfolio and was called **'PORTFOLIO VOLUME'**. Note that factor 1, 2 and 5 relate to the financial health (Hypothesis 1) while factor 3 and 4 capture the size of the reputation damage (Hypothesis 2).

5. REGRESSION MODEL SPECIFICATION

To test the hypotheses developed in section 2, we specified a multivariate regression model. Table 3 gives an overview of the dependent variable as well as explanatory variables together with the expected signs of the coefficients.

[Insert Table 3 about here]

In the model the quality of the financial statements (FSQ_i) of a client firm, i, is related to determinants of audit-firm quality. Note that subscript i is used whenever a variable is a client variable, and subscript j is used in case of an audit-firm variable. FSQ_i is the *dependent variable* in the analysis and is measured as the compliance with the new disclosure standard as described in Section 2. If a client firm complies, the dummy variable FSQ_i equals 1; it equals zero otherwise. The *independent variables* include both test and control variables. Viable determinants of audit quality are included as test variables. Based on the results of the factor analysis, we identified the following variables that are representative for each factor: return on assets (factor 1), current ratio (factor 2), net cash over total assets (factor 5), the median size of the clients as well as the percentage of clients with works council (factor 3), and lastly the number of clients (factor 4). Two remarks are in order here. First, with respect to the fourth factor we could have included $PSIZE_j$ only, but we believe that $PCOUNCIL_j$ contains incremental information as it draws special attention to an additional task the statutory auditor has in a firm with a works council. Second, to assess the joint impact of both the number and the size of the clients in a portfolio, we introduced an interaction variable between these two variables. We predict that the positive

association between FSQ and the number of clients in an audit firm's portfolio will be stronger at higher levels of median client size.

Several variables were included to control for other elements that affect the quality of the financial statements. Two control variables relate to the *auditor–client relationship*. First, the audit-report type is included ($REPORT_i$). This variable is representative of an auditor's perception of a client firm's overall financial condition. When an auditor decides to issue a non-clean audit report for going-concern reasons, he has doubts about the going concern of his client. In such a situation it is reasonable to expect that the auditor be more likely to insist on the application of the new standard. Second, a variable is introduced that measures the importance of the client in the portfolio of the audit firm. The more important a client to that audit firm's turnover, the more likely that the auditor's independence be tempted. As audit fee data are not publicly available in Belgium, we use the relative size of a client as control variable ($RELSIZE_i$).

Another type of control variables relates to *the financial performance of the client firm.* The literature on accounting disclosure (see for example Lev and Penman 1990; Lang and Lundholm 1993) reports evidence supportive of compliance with new accounting standards by better performing firms to signal this good news. Non-complying firms may try to cover up instead of disclosing bad news (i.e. that the going concern valuation basis can no longer be held). Variables capturing the financial condition of client firms are: the quick ratio ($QUICK_i$), return on assets (ROA_i), the existence of operational profits ($OPERATIONAL_i$), the level of retained earnings ($LTPROF_i$) and the short-term debt repayment capacity of the client firm ($REPAY_i$).

Finally we include the client firm's size as a control variable, as large firms are believed to disclose more information to the market, because the chance of one interested party discovering a breach and announcing it in the media is greater ($SIZE_i$).

6. SAMPLE SELECTION

Given the independent variables introduced in the previous section, we had to collect both individual audit-client information (i) and audit-firm portfolio information (j) (which is an aggregation of all audit-client information per audit firm). To select our sample firms we used the BNB-database. As the new disclosure standard only applies to 1) firms in financial difficulties, and 2) financial statements published after January 1, 1997, the population was limited to firms in financial difficulties with a year ending on December 31st 1997. 4849 such companies were identified based on 1997 financial statements. Next, all firms that did not appoint an independent auditor were excluded from the sample. This reduced our population to 3846 firms. As the notes to the financial statements as well as the audit report are not electronically available, but need to be purchased from the Belgian National Bank, it was economically not feasible to include all these firms into our analysis. Therefore a random sample of 250 companies from this population was drawn for which we purchased audit reports and notes. As some of the acquired information was not provided, our sample was reduced to 237 firms.

From analysing the disclosure practices of the 237 companies in the sample, we were able to distinguish three types of client firms: 1) companies that adopt going-concern based valuation but do not apply the new disclosure requirement, 2)

companies that adopt going-concern based valuation and that did apply the new disclosure requirement, and 3) companies that announce liquidation and adapt their valuation methods accordingly. For the purpose of this paper, the third group is irrelevant and hence eliminated (15 firms). Finally, a number of companies were dropped due to excessive missing values in their financial statements. The final sample contains 200 companies.

In a next step, we linked the information on the sample firms with the audit-firm portfolio measures developed in Section 4. To that end we merged the two databases. In total, there were 63 different audit firms auditing our 200 sample firms. The results of the analysis using the financial statement information of the 200 firms and the audit-firm portfolio characteristics of the 63 audit firms are discussed in the next section.

7. RESULTS

Of the 200 companies included in the sample, 29% or 58 companies did not apply the new disclosure standard. To explain this, we ran a multivariate logistic regression. Before we discuss the results, we comment on some descriptive statistics of the client portfolios of the 63 audit firms and the 200 individual sample firms.

Descriptive statistics

These descriptive statistics can be found in Table 4.

[Insert Table 4 about here]

All big 6 firms and 57 non-big 6 firms were included in the sample. The big 6 firms had more clients (8,530) than the non-big 6 firms (6,916). The average number of clients per audit firm is 1,422 for big 6 firms and 121 for non-big 6 firms. Note that this difference is highly significant ($p = 0.0001$, Wilcoxon test). The average size of the big 6 clients (181,170,000 BEF) is significantly larger than non-big 6 clients (143,485,000 BEF), and the presence of a works council is also more likely for big 6 clients ($p = 0.0001$). The descriptive statistics also show that the new disclosure standard is not a marginal phenomenon as it applies to 41.56% of the clients of big 6 firms and 38.35% of the non-big 6 clients.

The average audit-firm portfolio is financially healthy, as the average portfolio return on assets ($PROA_j$) is 14.2%, current ratio is larger than 1 (as derived from $PCURRENT_j$), and net cash position ($PCASH_j$) is positive. Comparison of the average audit-firm portfolio characteristics between big 6 and non-big 6 firms shows significant differences. Portfolios of big 6 firms are significantly more profitable ($PROA_j$, $p = 0.0001$), have a higher level of short-term debt relative to the current assets ($PCURRENT_j$, $p = 0.0001$), but the net cash position indicates that they are less dependent on bank debt ($PCASH_j$, $p = 0.0469$). These results indicate that either clients choose their auditor selectively or that audit firms screen their customers.

As to the financial characteristics of the 200 *sample firms*, it is obvious that the two criteria used to define firms in difficulties are clearly reflected in the data: on average, firms have a negative long term profitability ($LTPROF_i$, -0.266) as well as a

negative ROA_i (-0.020). The mean liquidity ratio ($QUICK_i$, 1.590) and short-term repayment position ($STREPAY_i$, 0.540) are good.

Multivariate analysis

The results of this analysis can be found in Table 5. As the model's chi-square statistic is highly significant (p = 0.0002) and the R^2 equals 21.97%, all independent variables contribute to the explanation of the FSQ_i. From the correlation matrix in Appendix A it is clear that the results are not distorted by correlation problems.

[Insert Table 5 here]

We find some evidence supportive of our *first hypothesis*. The net cash position of the audit-firm portfolio affects (the auditor's enforcement of) compliance with the new disclosure regulation, as $PCASH_j$ is significant (p = 0.0161). Note that $PCASH_j$ classified as a leverage measure in the factor analysis, and measures the short-term financial leverage of the audit-firm portfolio. The fact that only a portfolio *leverage* measure and not a liquidity or profitability measure is significant, could illustrate that audit firms are mainly concerned about possible reactions of banks. As banks closely monitor the financial position of their clients, they are often the first to be alerted and call for bankruptcy. Another explanation could be that financial problems have to be very severe before the audit firms demand compliance with the new disclosure standard. The result for $PCASH_j$ is not so unexpected, given the choice of our financial statement quality measure (see also Section 6) and the characteristics of the sample firms in the analysis, which are all relatively bad performers. However, not so much the type of portfolio characteristic found significant matters, but the fact

that audit-firms *do* differ in enforcing compliance with standards and hence in quality depending on the median financial performance of their portfolio.

We also report evidence that is supportive of our *second hypothesis*, namely that exposure to reputation damage also has an impact on financial statement and audit quality. Audit firms with more clients have more at stake and demand higher financial statement quality from their clients. The variable $PCLIENTS_j$ ($p = 0.0086$) is highly significant. However, the median size of the clients in portfolio ($PSIZE_j$) does not influence financial statement quality. This indicates that client size does not affect the auditor's perception of reputation damage. However, the negative coefficient on the interaction term ($PCLIENTS_j$ * $PSIZE_j$) shows that the positive association between FSQ_i and $PCLIENTS_j$ (the number of clients) decreases at higher levels of median size ($p = 0.0070$), which is different from expected. This could be explained by the audit firm's concern to maintain larger clients that generate more income to the audit firm. Finally, we also find that the percentage of firms in the audit-firm portfolio with a works council (PCOUNCILj) has a positive significant effects on FSQ ($p = 0.0078$).

As to the control variables, we find significant results for $REPORT_i$ ($p = 0.0035$), $LTPROF_i$, ($p = 0.0194$), $OPERATIONAL_i$, ($p = 0.0466$) and ROA_i ($p = 0.0821$). The client is more likely to apply the new disclosure standard when the auditor has doubts/concerns about the going concern status of the client firm, and as expected the financial health of the client firm influences financial statement quality. Different from the audit portfolio characteristics, profitability and solvency but not liquidity matter at the individual firm level. The results also show that auditors are

independent as the size of the client firm i in the portfolio is irrelevant in explaining financial statement quality.

To confirm our statement that audit portfolio characteristics better proxy audit quality differentiation than the traditionally used big 6/non-big 6 variable, we also tested Model 2 (see Table 5) where the dichotomous big 6/non-big 6 variable is tested instead of the audit-firm portfolio characteristics. As the explanatory power of the model (Pseudo-R^2) drops dramatically to 0.108, it is clear that audit-firm portfolio characteristics better capture the audit quality concept than the big 6/non-big 6 variable. Furthermore, the variable $BIG6_i$ is not significant, while there is little change in the results for the control variables. Given the results obtained from testing Model 1, we conclude that the $BIG6_i$-variable is too rough to capture differences in audit quality.

8. CONCLUSIONS

Traditionally, differences in audit quality are measured by distinguishing between big 6 and non-big 6 audit firms. As this is a rough measure, the major objective of this paper is the empirical refinement of determinants of audit quality. Based on prior theories about audit-firm incentives and reputation (DeAngelo 1981; Dye 1993), we linked audit-firm portfolio characteristics to the incidence and the size of subsequent audit-firm reputation damage. We hypothesise that as the portfolio of an audit firm 1) is financially weaker, and 2) contains more, larger and highly visible clients, the audit firm will supply higher audit quality, which results in higher financial statement quality. We find some evidence supportive of both hypotheses. First, the short-term

leverage of an audit firm's portfolio seems to matter, as we find evidence that suggests that the lower the median value of net cash position of a portfolio is, the higher financial statement quality and hence audit quality. Second, the size of the possible reputation damage is also important, as the number of clients in an audit firm's portfolio positively affects financial statement and audit quality.

From this study it is clear that not all the hypothesised audit-firm portfolio characteristics affect audit quality. Indeed, the results are to be seen in the context of the measure of financial statement quality that we chose, namely the adoption by client firms of a disclosure standard. However, we believe that not so much the type of the significant portfolio characteristic matters, but the fact that audit-firms *do* differ in terms of audit quality depending on the financial performance of the clients in their portfolio. Our suggestion for future research is to further examine the influence of audit-firm portfolio characteristics on financial statement quality in other financial reporting contexts using alternative measures for financial statement quality.

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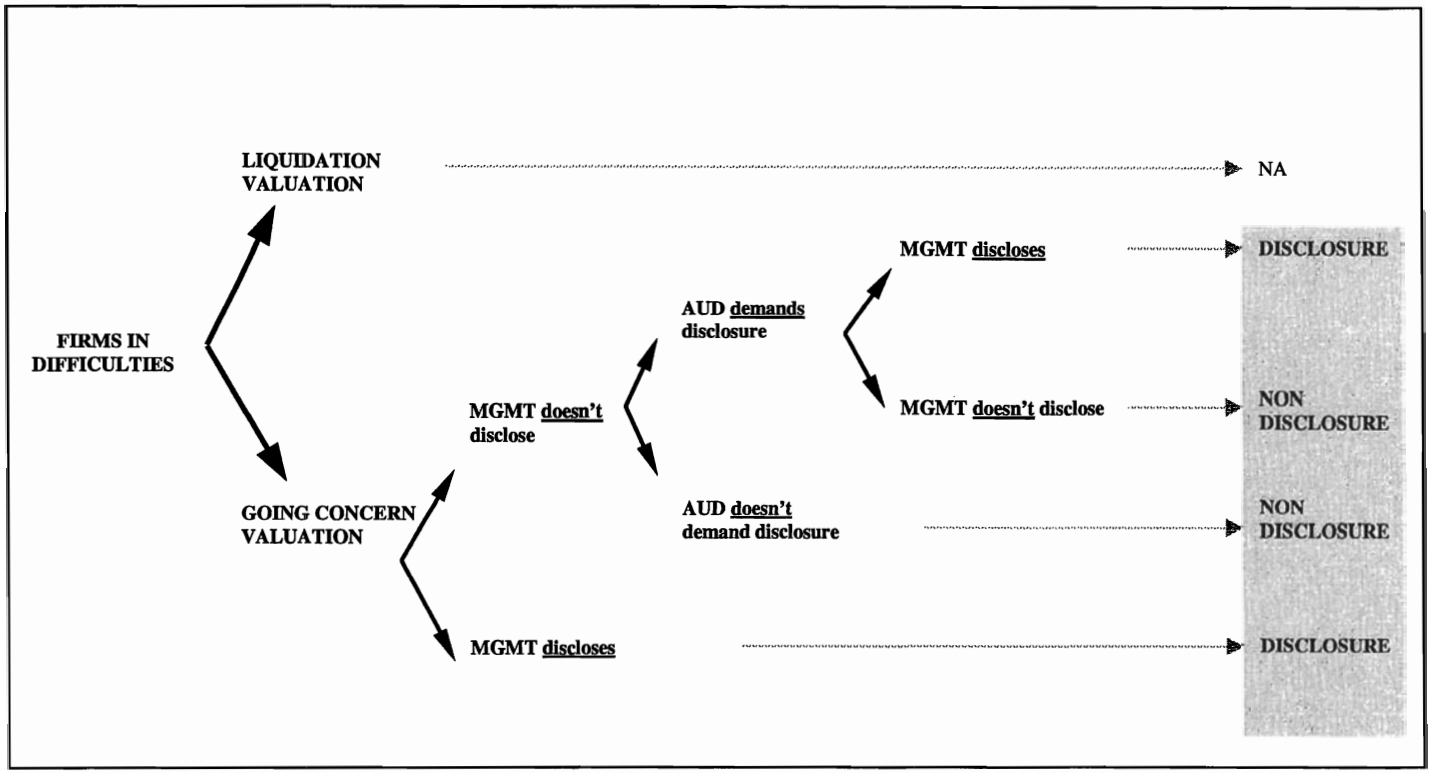
FIGURE 1: THE REPORTING PROCESS OF FIRMS IN DIFFICULTIES



With MGMT = management or the Board of Directors
AUD = auditor

TABLE 1: PORTFOLIO CHARACTERISTICS (ALL VARIABLES ARE DEFINED AT PORTFOLIO LEVEL)

Variables		Mean
$PCURRENT_j$	*median current ratio*	1.4603
$PQUICK_j$	*median quick ratio*	1.2133
$PCASH_j$	*median value for (net cash/total assets)*	0.0217
$PROA_j$	*median ROA*	0.0322
$PROE_j$	*median ROE*	0.0602
$PLEVERAGE_j$	*median leverage*	2.0563
$PAUTO_j$	*median value for (reserves+retained earnings / total assets)*	0.0738
$PINDEP_j$	*median value for (equity/total assets)*	0.3119
$PSTREPAY_j$	*median value for (Cash Flow / short term debt)$^{-1}$*	0.0772
$PDIFFIC_j$	*relative number of clients 'in difficulties'*	40.9067
$PTOTAL_j$	*total sum of all assets of all clients*	187180000
$PSIZE_j$	*median amount of client's total assets*	161304.3
$PEMPLOY_j$	*median number of client's employees*	54.2475
$PCOUNCIL_j$	*relative number of clients with a workers' council*	8.9972
$PCLIENTS_j$	*total number of clients*	122.1091

TABLE 2: ROTATED FACTOR PATTERN (LOADING) FOR A FIVE-FACTOR SOLUTION (N=165)[A]

Variables	Factor 1 PROFITABILITY	Factor 2 LIQUIDITY	Factor 3 VISIBILITY	Factor 4 PORTFOLIO VOLUME	Factor 5 LEVERAGE
PQUICK	-0.0783	**0.9845**	-0.0529	-0.0217	-0.0457
PACID	-0.0929	**0.9811**	-0.0463	-0.0048	-0.0655
PCASH	0.5633	0.0312	-0.0661	0.0292	**-0.6043**
PROA	**0.7408**	-0.0145	-0.0392	0.1016	-0.0030
PROE	-0.2224	-0.0073	0.4836	-0.0727	-0.1286
PLEVERAGE	0.0308	-0.0573	-0.1778	0.0524	**0.8020**
PSELF	**0.7916**	-0.1898	-0.1282	-0.1300	-0.0110
PINDEP	**0.6034**	0.4084	-0.2385	-0.0458	-0.3387
PCF	0.1228	-0.0872	0.0275	-0.2855	0.3507
PDIFFIC	**-0.7324**	0.1438	-0.1001	-0.0099	-0.4127
PTOTAL	0.0263	-0.0160	0.1227	**0.9547**	-0.0112
PSIZE	-0.0924	-0.0487	**0.8477**	-0.0023	0.1471
PEMPLOY	0.1211	-0.0020	**0.6923**	0.1997	0.0262
PCOUNCIL	-0.0543	-0.1457	**0.7295**	0.0582	-0.4798
PCLIENTS	0.0184	-0.0496	0.0262	**0.9565**	-0.0203
Variance explained by each factor (percentage)	18.4000	16.7600	14.7500	11.7100	8.2700
Cumulative variance explained by 5 factors: (percentage)		69.89			

[a] Rotation method: Varimax

TABLE 3: MODEL FOR EXPLAINING FSQ (FINANCIAL STATEMENT QUALITY)

Hypotheses and explanatory variables		**Expected sign**
Dependent variable		
FSQi	dummy, which equals 1 if a firm i applies the new standard and explains its valuation methods; zero otherwise	
Independent test variables		
H1: Chance of a reputation loss		
$PROA_j$	median ROA of the entire client portfolio of an audit firm j	-
$PCURRENT_j$	median current ratio of the entire client portfolio of an audit firm j	-
$PCASH_j$	median value for (net cash/total assets) of the entire client portfolio of an audit firm j	-
H2: Cost of a reputation loss		
$PCLIENTS_j$	total number of clients in the portfolio of firm j	+
PSIZEj	size of the median client in the portfolio of j (total assets)	+
$PCLIENTS_j$* PSIZEj	The interaction variable between total number of clients and the size of the median client in the portfolio	+
$PCOUNCIL_j$	percentage of client firms of an auditor j with a works council (%)	+
Independent control variables		
$REPORT_i$	a dummy, which equals 1 if the company does not receive an unqualified report without explanatory paragraph for going concern problems; zero otherwise.	+
$RELSIZE_{ij}$	ratio of total assets of company i to the sum of total assets of all clients of audit firm j, expressed as a percentage	-
$SIZE_i$	natural logarithm of the total assets of sample firm i	+
$QUICK_i$	ratio of (accounts receivable >1 year + cash) to short term debt for company i	+
ROA_i	return on assets for company i	+
$OPERATIONAL_i$	a dummy which equals 1 if company i has a positive result from operations	+
$LTPROF_i$	Ratio of (reserves + retained earnings) to the total assets for company I	+
$STREPAY_i$	Inverse ratio of cash flow to short term debt expiring within one year for company i	-

TABLE 4: DESCRIPTIVE STATISTICS

	MEAN	BIG 6 firms	Non-big 6 firms	< p
Number of audit firms	-	6	57	-
Total number of clients		8530	6919	-
Percentage of client firms in difficulties	40.10%	41.56%	38.35%	-
$PROA_j$	0.037	0.0404	0.033	0.0001 **
$PCURRENT_j$	1.202	1.184	1.22	0.0001 **
$PCASH_j$	0.024	0.027	0.021	0.0469 **
$PCLIENTS_j$	889	1568	196	0.0001 **
$PSIZE_j$	162617	181170	143485	0.0001 **
$PCOUNCIL_j$	11.6	13.724	9.543	0.0001 **
$REPORT_i$	0.321	0.364	0.278	0.2023
$RELSIZE_{ij}$	1.5	0.071	3.021	0.0001 **
$SIZE_i$	12.082	12.245	11.916	0.135
$QUICK_i$	1.59	1.679	1.5	0.3392
ROA_i	-0.02	-0.031	-0.008	0.1544
$OPERATIONAL_i$	0.429	0.384	0.474	0.2028
$LTPROF_i$	-0.266	-0.265	-0.266	0.2683
$STREPAY_i$	0.54	0.703	0.377	0.0593 *

[#] Note that there were 2953 client companies that belonged to both sub-samples since they were audited by two audit firms: a big 6 as well as by a Non-big 6 audit firm. Taken together, the 63 audit firms perform audits on 12,496 *different* client firms.

TABLE 5: RESULTS FROM THE LOGISTIC REGRESSION LINKING FSQ AND AUDIT PORTFOLIO CHARACTERISTICS

$$FSQ_i = B_0 + B_1 PROA_j + B_2 PCURRENT_j + B_3 PCASH_j + B_4 PCLIENTS_j + B_5 PSIZE_j + B_6 (PCLIENTS_j * PSIZE_j) + B_7 PCOUNCIL_j + B_8 REPORT_i + B_9 RELSIZE_{ij} + B_{10} SIZE_i + B_{11} QUICK_i + B_{12} ROA_i + B_{13} OPERATIONAL_i + B_{14} LTPROF_i + B_{15} STREPAY_i + \varepsilon_i$$

Variable		MODEL 1 Parameter Estimate	Standard Error	Wald Chi-Square	p <		MODEL 2 Parameter Estimate	Standard Error	Wald Chi-Square	p <	
INTERCEPT		-4.8585	3.8705	1.5757	0.2094		0.7626	1.2105	0.3969	0.5287	
$PROA_j$	(FACTOR 1)	25.1710	25.7036	0.9590	0.3274						
$PCURRENT_j$	(FACTOR 2)	2.7531	2.5798	1.1389	0.2859						
$PCASH_j$	(FACTOR 5)	-23.3126	9.6851	5.7939	0.0161	**					
$PCLIENTS_j$	(FACTOR 4)	0.00352	0.00134	6.9088	0.0086	**					
$PSIZE_j$	(FACTOR 3)	1.991E-06	8.026E-06	0.0615	0.8041						
$PCLIENTS_j * PSIZE_j$	-	-2.34E-08	8.68E-09	7.2630	0.0070	**					
$PCOUNCIL_j$	(FACTOR 3)	0.1591	0.0598	7.0874	0.0078	**					
$BIG6_i$							0.1279	0.3517	0.1323	0.7161	
$REPORT_i$		1.3919	0.4762	8.5445	0.0035	**	1.0824	0.4233	6.5406	0.0105	**
$RELSIZE_{ij}$		-0.0773	0.0510	2.3003	0.1294		-0.0134	0.0194	0.4795	0.4886	
$SIZE_i$		0.0517	0.1005	0.2643	0.6072		0.0170	0.0959	0.0.0314	0.8593	
$QUICK_i$		0.1253	0.1045	1.4372	0.2306		0.1035	0.0956	0.1720	0.2790	
ROA_i		2.9086	1.6730	3.0227	0.0821	*	2.8368	1.6017	3.1368	0.0765	*
$OPERATIONAL_i$		-0.8255	0.4148	3.9600	0.0466	**	-0.6985	0.3737	3.4930	0.0616	
$LTPROF_i$		0.7596	0.3248	5.4694	0.0194	**	0.6326	0.3108	4.1439	0.0418	**
$STREPAY_i$		0.00501	0.0533	0.0088	0.9252		0.0329	0.0500	0.4323	0.5109	
			Model χ^2	41.870 **				Model χ^2	22.700 **		
			Pseudo-R^2	**0.22**				**Pseudo-R^2**	**0.108**		

The dependent variable, FSQ_i, equals 1 if the new reporting requirement is applied, 0 otherwise. Independent variables are defined in table I.
*, ** = p-value < .10, .05, respectively

APPENDIX A : PEARSON CORRELATION COEFFICIENTS FOR THE INDEPENDENT VARIABLES

	$PROA_j$	$PCURRENT_j$	$PCASH_j$	$PCLIENTS_j$	$PSIZE_j$	$PCOUNCIL_j$	$REPORT_i$	$RELSIZE_i$	$SIZE_i$	$QUICK_i$	ROA_i	$OPERATIONAL_i$	$LTPROF_i$	$STREPAY_i$
$PROA_j$	1	0.29011	0.21669	0.30304	-0.23636	-0.22854	-0.06401	-0.63878	-0.03750	0.09262	0.03597	0.13273	-0.09546	0.02065
$PCURRENT_j$		1	0.29271	-0.12992	-0.46282	-0.37937	-0.11200	-0.44341	-0.02258	0.06822	-0.00784	0.01132	-0.04313	-0.12213
$PCASH_j$			1	0.08937	0.17212	0.48819	0.03445	0.04900	0.02533	0.00857	-0.03001	-0.06546	0.03729	-0.06786
$PCLIENTS_j$				1	0.14567	0.17063	0.10137	-0.19691	0.05132	0.02121	-0.02057	-0.02657	0.00046	0.08032
$PSIZE_j$					1	0.76783	0.11704	0.52568	0.07594	-0.00051	-0.0103	-0.11652	-0.03497	0.0051
$PCOUNCIL_j$						1	0.08379	0.61547	0.04908	0.02517	-0.03133	-0.13516	-0.0328	0.02281
$REPORT_i$							1	0.12736	-0.01276	-0.07221	-0.04942	-0.11038	0.06613	0.08459
$RELSIZE_i$								1	0.03947	-0.03659	-0.02659	-0.08305	0.01602	-0.02413
$SIZE_i$									1	-0.21026	0.00041	-0.00834	0.16927	0.0282
$QUICK_i$										1	0.03242	-0.12236	-0.68585	-0.02964
ROA_i											1	0.28026	0.07728	-0.02813
$OPERATIONAL_i$												1	0.05373	-0.09823
$LTPROF_i$													1	-0.05326
$STREPAY_i$														1